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largely to place physiology in its proper position among the experimental sciences.

A glance through the annual reports on the progress of Physiology shows that the name of Valentin appears several times in nearly every year as a contributor to the periodical literature of this science. In addition to these labors, he found time to write a text-book of physiology, which was translated into English by Dr. Brixton.

His latest work seems to have been a series of articles entitled "Histologische und Physiologische Studien," the publication of which in the *Zeitschrift für Biologie* continued as late as 1882.

CHARLES ADOLPHE WURTZ.

THE sad intelligence of the death of this distinguished French chemist, on the 12th of May, comes to us by telegraph, just as we are completing this Report, and we have no time for an extended notice. He was not elected a Foreign Honorary Member of this Academy until the last annual meeting, so that his name has not yet appeared on our printed list. His death, following so closely that of Dumas, leaves a vacancy in the ranks of the French chemists which cannot soon be filled.

Wurtz was born at Strasburg, November 16, 1817, where he was educated. He became a student in the chemical department of the medical school of his native city in 1839, and took his degree there in 1843. Soon after he moved to Paris, where he began his chemical career as assistant to Dumas, and first acquired an independent position as Professor at the Agricultural Institute at Versailles. After the death of Orfila, in 1853, and the retirement of Dumas, in 1854, their chairs were united in that of Medical Chemistry, and given to Wurtz. He became Dean of the Medical Faculty in 1866, and subsequently was elected Professor of Chemistry at the Sorbonne.

It is, however, with the Medical School in Paris that Wurtz is chiefly identified, and his investigations were carried on in the laboratory of that institution. Under the influence of Laurent and Gerhardt, Wurtz's studies were early directed towards organic chemistry; and to him is due, in no small measure, the development of modern structural chemistry. Almost at the outset of his career, he discovered the remarkable reaction by which the primary amines are produced from the cyanates of the alcohol radicals, and thus gave prominence and greater definiteness to the ammonia type of chemical compounds.

Subsequently he studied the action of sodium on the iodides of the alcohol radicals. Previously, by the action of zinc on the iodide of ethyl and methyl, Frankland had succeeded in isolating hydro-carbon, which he regarded as the actual alcohol radical; but Wurtz, using a mixture of the iodide of two radicals, found that he obtained a homogeneous product, which was formed by a union of the two radicals. This left no doubt that Frankland's radical substance was also formed by the union of two molecules of methyl or ethyl, and rendered our views of the relations of such radicals much clearer than before. In order to define the radicals of organic chemistry more accurately, Wurtz introduced the term "rest," and enunciated the rule, which for a long time held an important place in the science, "that the atomicity of a compound radical is always equal to the number of hydrogen atoms, or their equivalents, which the rest may be regarded as having lost."

Soon after followed Wurtz's remarkable investigations on the glycols, and oxide of ethylene, by which he not only defined the di-atomic alcohols, and gave us our first accurate knowledge of these bodies, but also developed the theory of types into the larger doctrine of quantivalence, in which he recognized the determining cause of molecular structure; and it was in the discussion on the constitution of lactic acid which followed this investigation that Wurtz made the distinction between basicity and atomicity. Subsequently, by the action of hydriodic acid on amylene, Wurtz obtained a product isomeric with amyl alcohol, and the investigation of this new substance resulted in defining the relations of the now well-known class of tertiary alcohols. We must not forget to mention also the synthesis of the oxygen bases, including that of choline, — so interesting as one of the proximate principles of the animal economy; also the synthesis of the aromatic acids, followed during these last years by a study of the condensation products from aldehyde, by which he isolated aldol and other compounds after the same type.

Among Wurtz's later investigations is one into which he was led by a controversy with some of his colleagues in the French Academy, in regard to abnormal vapor densities as bearing on the validity of the law of Avogadro. The discussion chiefly turned on the action of heat on hydrate of chloral, and by a most ingenious series of experiments Wurtz proved that aqueous vapor was present as such in the vapor of this substance, and therefore that the apparent abnormal vapor density of hydrate of chloral was due to disassociation.

This controversy indicated Wurtz's nearly isolated position among

the modern school of French chemists. As the writer has stated, in the notice of Dumas, the French school, as a rule, repudiate the legitimate consequences of the very movement which originated with their immediate predecessor. Wurtz, however, although with the strongest French sympathies, and while claiming chemistry as almost exclusively a French science,* saw throughout the inconsistency of this position, and, as he aided in developing, has sought to maintain in its integrity, the system of modern structural chemistry. Wurtz's volumes on the Philosophy of Chemistry, which have appeared in different languages under several titles, contain an elegant exposition of this system. Wurtz was also the author of several elementary treatises on Chemistry, the editor of a Dictionary of Chemistry, of the "*Répertoire de Chimie Pure*," and one of the editors of the "*Annales de Chimie et de Physique*." It would be impossible in a limited sketch to give more than the barest outline of his scientific and literary work. Indeed, previously to 1864 he had published seventy-three papers, as shown by the Catalogue of the Royal Society.

In 1867 Wurtz became a member of the Academy of Sciences, and in 1881-82 presided over that body. He received many distinguished honors, and a few years since was made Senator of France.

Since the last Report, the Academy has received an accession of nine new members ; viz. four Resident Fellows, three Associate Fellows, and two Foreign Honorary Members. The list of the Academy corrected to the date of this Report is hereto added. It includes 193 Resident Fellows, 85 Associate Fellows, and 66 Foreign Honorary Members.

* See the Introduction to his work on Chemical Philosophy.